

# Pin Shuai

ASSISTANT PROFESSOR · UTAH WATER RESEARCH LABORATORY · UTAH STATE UNIVERSITY

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## Research Interests

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My research interests lie primarily in two areas. The first area is understanding of the hydrological, biogeochemical processes occurring at the aquatic-terrestrial interface under the impact of groundwater and surface water interactions. The second area is quantifying the flow and transport of heat, nutrients and contaminants from bedrock to canopy top in a watershed, and feedbacks between hydrology, land use, and climate change. I apply a model-data integrative approach which combines field, laboratory, and remote sensing techniques with numerical models leveraging the power of high-performance computing to improve understanding of hydrological processes. I am also a strong advocate for open source and reproducible scientific research.

## Education

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### Texas A&M University

#### PHD IN GEOLOGY

College Station, Texas, USA

2013 - 2017

- *Advisors:* Dr. Peter Knappett and Dr. M. Bayani Cardenas (University of Texas, Austin)
- *Dissertation:* Nutrients and Contaminants Fate and Transport under the Impact of Groundwater and Surface Water Interactions

### Wuhan University

#### MS IN WATER RESOURCES ENGINEERING

Wuhan, China

2011 - 2013

- *Advisor:* Dr. Jinzhong Yang
- *Thesis:* Estimation of Groundwater Recharge in the Northern China Plain: A Field and Laboratory Study

### Wuhan University

#### BS IN WATER RESOURCES ENGINEERING

Wuhan, China

2007 - 2011

## Professional Experience

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2022-present	<b>Assistant Professor</b> , Dept. of Civil and Environmental Engineering and Utah Water Research Laboratory, Utah State University
2020-2022	<b>Earth Scientist</b> , Atmospheric Sciences and Global Change Division, Pacific Northwest National Laboratory
2017-2020	<b>Post Doctorate Research Associate</b> , Atmospheric Sciences and Global Change Division, Pacific Northwest National Laboratory
2016	<b>Summer Intern</b> , Atmospheric Sciences and Global Change Division, Pacific Northwest National Laboratory
2013-2017	<b>Graduate Research Assistant</b> , Texas A&M University
2011-2013	<b>Graduate Research Assistant</b> , Wuhan University

## Publications

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### PEER-REVIEWED ARTICLES

\* *graduate students or post-doc author*

See a full list of publication and citation on **Google Scholar**

Sun A, Jiang P, **Shuai P**, Chen X (2024). Bridging hydrological ensemble simulation and learning using deep neural operators. *Water Resources Research*. DOI:10.1029/2024WR037555

Jiang P, **Shuai P**, Sun A, Chen X (2024). Optimizing Parameter Learning and Calibration in an Integrated Hydrological Model: Impact of Observation Length and Information. *Journal of Hydrology*. DOI: 10.1016/j.jhydrol.2024.131889

- Zhu B, Huang M, Chen X, Bisht G, **Shuai P**, and Xie X (2024). Effects of River-Aquifer Interactions on the Hydrological Cycle in a Semiarid Riparian Zone: A Modeling Study. *Hydrological Processes*. DOI: 10.1002/hyp.15230
- Shuai P**, Jiang P, Coon, E, and Chen X (2023). The Importance of Explicitly Representing the Streambed in Watershed Models. *Hydrological Processes*. DOI: 10.1002/hyp.15043
- Jiang P, **Shuai P**, Sun A, Mudunuru M, and Chen X (2023), Knowledge-Informed Deep Learning for Hydrological Model Calibration: An Application to Coal Creek Watershed in Colorado. *Hydrol. Earth Syst. Sci.*. DOI: 10.5194/hess-27-2621-2023.
- Coon E and **Shuai P** (2022), Watershed Workflow: a toolset for parameterizing data-intensive, hyperresolution hydrologic models. *Environmental Modeling & Software*. doi: 10.1016/j.envsoft.2022.105502
- Shuai P**, Chen X, Mital U, Coon E and Dwivedi D (2022), The Effects of Spatial and Temporal Resolution of Gridded Meteorological Forcing on Watershed Hydrological Responses. *Hydrology and Earth System Sciences*. doi: 10.5194/hess-26-2245-2022
- Chen K, Chen X, Song X, Briggs MA, Jiang P, **Shuai P**, Hammond G, Zhan H, Zachara JM (2022). Using Ensemble Data Assimilation to Estimate Transient Hydrologic Exchange Fluxes under Highly Dynamic Flow Conditions. *Water Resources Research*. DOI: 10.1029/2021WR030735
- Bao J, Chen Y, Fang Y, Song X, Perkins W, Duan Z, **Shuai P**, Ren H, Hou Z, Richmond M, He X, and Scheibe T (2021). Modeling framework for evaluating the impacts of hydrodynamic pressure on hydrologic exchange fluxes and residence time for a large-scale river section over a long-term period. *Environmental Modeling & Software*, DOI: 10.1016/j.envsoft.2021.105277
- Zheng L, Wang L, Wang T, Singh K, Zhou J, **Shuai P**, Wang Z, Chen X (2021) Characterizing shear-thinning fluids transitioning from rheology- to inertia-dominated flow regimes in porous media. *Journal of Hydrology*, DOI: 10.1016/j.jhydrol.2021.126498
- Cromwell E, **Shuai P**, Jiang P., Coon ET, Painter SL, Moulton JD, Lin Y, Chen X (2021) Estimating Watershed Subsurface Permeability From Stream Discharge Data Using Deep Neural Networks. *Frontiers in Earth Science*, 9:613011. DOI: 10.3389/feart.2021.613011
- Fang Y, Song X, Ren H, Perkins WA, **Shuai P**, Richmond MC, Hou Z, Bao J, Chen X and Scheibe TD (2020) High-Performance Simulation of Dynamic Hydrologic Exchange and Implications for Surrogate Flow and Reactive Transport Modeling in a Large River Corridor. *Frontiers in Water*, 2:564211. DOI: 10.3389/frwa.2020.564211
- Song X, Chen X, Zachara JM, Gomez-Velez JD, **Shuai P**, Ren H, Hammond G (2020) River Dynamics Control Transit Time Distributions and Biogeochemical Reactions in a Dam-Regulated River Corridor. *Water Resources Research*, DOI: 10.1029/2019WR026470
- Zachara JM, Chen X, Song X, **Shuai P**, Murray C, Resch C (2020) Kilometer-scale hydrologic exchange flows in a river corridor and their implications to solute migration. *Water Resources Research*. DOI: 10.1029/2019WR025258
- Shuai P**, Chen X, Song X, Hammond G, Zachara JM, Royer P, Ren H, Perkins W, Richmond M, Huang M (2019). Dam Operations and Subsurface Hydrogeology Control Dynamics of Hydrologic Exchange Flows in a Regulated River Reach. *Water Resources Research*. DOI: 10.1029/2018WR024193 (**Top downloaded paper 2018-2019**)
- Berube M, Jewell K, Myers K, Knappett PSK, **Shuai P**, Dimova N, Hossain A, Lipsi M, Hossain S, Peterson J, Ahmed KM, Datta S (2018). The fate of arsenic in groundwater discharged to the Meghna River, Bangladesh. *Environmental Chemistry*, 15(2), 29. DOI: 10.1071/EN17104
- Shuai P**, Cardenas MB, Knappett PSK, Bennett PC, Neilson BT (2017). Denitrification in the banks of fluctuating rivers: The effects of river stage amplitude, sediment hydraulic conductivity and dispersivity, and ambient groundwater flow. *Water Resources Research*, 53(9), 7951–7967. DOI: 10.1002/2017WR020610
- Shuai P**, Knappett PSK, Hossain S, Hosain A, Rhodes K, Ahmed KM, Cardenas MB (2017). The Impact of the Degree of Aquifer Confinement and Anisotropy on Tidal Pulse Propagation. *Groundwater*, 55(4), 519–531. DOI: 10.1111/gwat.12509
- Knappett PSK, Mailloux BJ, Choudhury I, Khan MR, Michael HA, Barua S, Mondal DR, Steckler MS, Akhter SH, Ahmed KM, Bostick B, Harvey CF, Shamsudduha M, **Shuai P**, Mihajlov I, Mozumder R, van Geen A (2016). Vulnerability of low-arsenic aquifers to municipal pumping in Bangladesh. *Journal of Hydrology*, 539, 674–686. DOI: 10.1016/j.jhydrol.2016.05.035
- Briody AC, Cardenas MB, **Shuai P**, Knappett PSK, Bennett PC (2016). Groundwater flow, nutrient, and stable isotope dynamics in the parafluvial-hyporheic zone of the regulated Lower Colorado River (Texas, USA) over the course of a small flood. *Hydrogeology Journal*. DOI: 10.1007/s10040-016-1365-3

**Shuai P**, Shi L, Cai S, Yang J (2014). The usage of bromide as a tracer to estimate groundwater recharge rate at Northern China Plain. *Journal of Irrigation and Drainage*. 33, no. 2:11-16. (In Chinese)

## CONFERENCE PROCEEDINGS

Knappett PSK, Myers K, **Shuai P**, Rhodes K, Jewell K, Peterson J, Dimova N et al. (2016). Tracking the fate of arsenic in groundwater discharged to the Meghna River. In *Arsenic Research and Global Sustainability: Proceedings of the Sixth International Congress on Arsenic in the Environment (As2016)*, June 19-23, 2016, Stockholm, Sweden, p. 43. CRC Press.

## STUDENTS' THESIS AND DISSERTATION

Othman Jihad (2024). Quantitative Evaluation of Baseflow Separation Methods Using an Integrated Hydrologic Model: A Case Study in a Snow-Dominated Watershed. *MS Thesis*, Utah State University. All Graduate Reports and Creative Projects, Fall 2023 to Present. 60. <https://digitalcommons.usu.edu/gradreports2023/60>

## IN REVIEW

Li Z, Li B, Jiang P, Hammond G, **Shuai P**, Coon E, and Chen X. Evaluating the effects of burn severity and precipitation on post-fire watershed responses using distributed hydrologic models. *Water Resources Research*. Preprint DOI: 10.22541/essoar.170224575.51711472/v1

Othman J\*, **Shuai P**. Quantitative Evaluation of Baseflow Separation Methods Using an Integrated Hydrologic Model: A Case Study in a Snow-Dominated Watershed. *Water Resources Research*. Preprint DOI: 10.22541/essoar.175734653.33151714/v1

## IN PREP

Ebrahimi E\*, **Shuai P**, Bakar S, Triana E. Extended Hydrofabric: A: Standardized Geospatial Database for Reproducible Water Management Modeling. *To be submitted to Environmental Modelling & Software*

Mukherjee N\*, Gao B, Coon ET, **Shuai P**, Hill D, Neilson BT, Kling GW, Chen J, and Cardenas MB. Climate change impacts on supra-permafrost soil and aquifer hydrology: broader areas and longer periods of activity. *To be submitted to Science Advances*

Terry N, Briggs M, Gooseff M, Zeng C, **Shuai P**, White E, Arntzen E, DiGiorno M, Opatz C, Chen X. Refining the Hydrogeologic Framework of a Large River Corridor Model Using Waterborne Transient Electromagnetics.

**Shuai P**, Chen X, Hammond G, Song X, Chen K, Zachara JM, Perkins WA, and Richmond MC. The Interplay between Subsurface Hydrogeology, River Geomorphology and Flow Dynamics Controls River Corridor Thermal Regimes.

## Open-Source Software & Datasets

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### SOFTWARE

Coon E and **Shuai P**, (2022) Watershed Workflow. *Python Package*  
<https://github.com/environmental-modeling-workflows/watershed-workflow>

**Shuai P** et al., (2022) ModVis. *Python Package* <https://github.com/pinshuai/modvis>

### DATASETS

**Shuai P**, Jiang P, Coon, E, and Chen X. Data-model files associated with the manuscript titled "The Importance of Explicitly Representing the Streambed in Watershed Models" (Shuai et al., 2023 HP). River Corridor and Watershed Biogeochemistry SFA, *ESS-DIVE repository*. doi:10.15485/2008111

**Shuai P**, Chen X, Mital U, Coon E and Dwivedi D, Data-model files associated with the manuscript "The Effects of Spatial and Temporal Resolution of Gridded Meteorological Forcing on Watershed Hydrological Responses" (Shuai et al., 2022 HESS) *ESS-DIVE repository*. doi: 10.15485/1861432

Cromwell E, **Shuai P**, Jiang P, Coon ET, Painter SL, Moulton JD, Lin Y, Chen X (2021) Estimating Watershed Subsurface Permeability From Stream Discharge Data Using Deep Neural Networks. *ESS-DIVE repository*. doi:10.15485/1756193

## Presentations

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\*\*undergraduate student, \* graduate students or post-doc author, + presenting author if not first author

## INVITED TALKS

- Shuai, P.** 2023. *Hyper-resolution watershed hydrologic modeling: Leveraging the power of parallel computing and open science tools*. Spring Runoff Conference at USU, Logan, UT (03/14/2023).
- Shuai, P.** 2022. *Neversink Watershed Modeling*. Seminar with USGS Integrated Modeling Team (Online, 08/22/2022).
- Shuai, P.** 2021. *Impact of Surface Water Groundwater Interactions on the Transport of Water, Energy, Nutrients, and Contaminants from the Local to the Watershed Scale*. Utah State University, Logan, UT (12/09/2021).
- Shuai, P.** 2021. *Watershed Model Intercomparison between ATS, SWAT and NWM: An example with the American River Watershed*. ATS short course at Oak Ridge National Laboratory, Oak Ridge, TN, United States (Online).
- Shuai, P.** 2020. *Hydrogeologic and Geomorphic Controls on Hydrologic Exchange Flows and River Corridor Thermal Regimes in the Hanford Reach of the Columbia River*. Lunchtime seminar at USGS ORWSC, Portland, Oregon, United States.
- Shuai, P.** 2019. *Hydrologic Exchange Flows and Thermal Regimes in the Hanford Reach: The Effects of Dam Operations, River Morphology and Subsurface Hydrogeology*. Seminar at Washington State University Tri-Cities, Richland, Washington, United States.
- Shuai, P.** 2019. *Hydrologic Exchange Flows Control on Temperature Regime and Ecological Impacts*. SFA Community Watershed Workshop at Pacific Northwest National Laboratory, Richland, Washington, United States
- Shuai, P.** 2019. *Simulating flow and heat transport in a large regulated river corridor*. Workshop on Critical Timescales of Hydrologic Transport at University of California-Berkeley, Berkeley, California, United States.

## SELECTED PRESENTATIONS

- Hill D\*, Neilson BT, **Shuai, P.**, Gao B, Coon E, Chen J, Cory R, Kling G, Cardenas MB, 2025. *Hydrologic Observations Across the Hillslope-to-River Corridor of an Arctic Tundra Watershed*. Poster presentation at DOE ESS PI Meeting, Reston, VA, United States.
- Mukherjee N\*, Gao B, **Shuai, P.**, Coon E, Chen J, Neilson BT, Cory R, Kling G, Cardenas MB, 2025. *Impacts of changing hydrologic conditions on groundwater flow and reactive solute transport in supra-permafrost aquifers*. Poster presentation at DOE ESS PI Meeting, Reston, VA, United States.
- Mukherjee N\*, **Shuai, P.**, Gao B, Coon E, Chen J, Neilson BT, Cory R, Kling G, Cardenas MB, 2024. *Impacts of climate conditions on groundwater flow and reactive solute transport in supra-permafrost aquifers*. Oral presentation at AGU Annual Meeting 2024, Washington DC, United States.
- Villaruel S\*\*, Mukherjee N\*, Hill D\*, Cardenas M, Coon E, Cory R, Neilson B, **Shuai, P.**, Kling G, Cardenas MB 2024. *Hydrostratigraphy of the active layer in riparian valley bottoms of an arctic watershed*. Poster presentation at AGU Annual Meeting 2024, Washington DC, United States.
- Ebrahimi E\*, **Shuai, P.**, Triana E, 2024. *Enhancing Water Management Modeling through Extended Hydrofabric*. Poster presentation at AGU Annual Meeting 2024, Washington DC, United States.
- Othman J\*, **Shuai, P.**, 2024. *Quantitative Evaluation of Baseflow Separation Methods Using an Integrated Hydrologic Model: A Case Study in a Snow-Dominated Watershed*. Oral presentation at AGU Annual Meeting 2024, Washington DC, United States.
- Ebrahimi E\*, **Shuai, P.**, Triana E, 2024. *Enhancing Water Management Modelling through an Extended Hydrofabric*. Poster presentation at CIROH Developers Conference, Salt Lake City, UT, United States.
- Cardenas MB, Neilson BT, **Shuai P.**, Cory R, Kling G, Mukherjee N\*, Gao B, Coon E, 2024. *Dynamics of Interconnected Surface-Subsurface Flow and Reactive Transport Processes Across the Hillslope-Riparian Zone River Corridor Continuum of Cold, High-Latitude Watersheds*. Poster presentation at DOE ESS PI Meeting, Reston, VA, United States.
- Mukherjee N\*, **Shuai, P.**, Neilson BT, Cory R, Kling G, Coon E, Cardenas MB, 2023. *Investigating Groundwater Flow and Thermal Transport in Arctic Supra-Permafrost Aquifers Using Field Observation Driven Integrated Surface/Subsurface Models*. Poster presentation at AGU Annual Fall Meeting 2023, San Francisco, CA, United States.
- Shuai, P.**, Covino TP, Elder K, Star B, Fegel T, Rhoades C, Chen X, Stegen J, 2023. *Understanding the Impact of Timber Harvesting on Hillslope Hydrological and Biogeochemical Fluxes in a Headwater Catchment*. Poster presentation at AGU Annual Fall Meeting 2023, San Francisco, CA, United States.
- Shuai, P.**, Covino TP, Elder K, Star B, Fegel T, Rhoades C, Chen X, Stegen J, 2023. *Understanding the impact of land cover change on hillslope hydrological and biogeochemical fluxes in a headwater catchment*. Oral presentation at Interagency Conference on Research in the Watersheds 8th Meeting 2023, Corvallis, OR, United States.

- Shuai, P**, Jiang P, Coon, E, and Chen X, 2022. *The Effects of Riverbed Properties on Watershed Hydro-Biogeochemical Processes*. Poster presentation at AGU Fall Meeting 2022, Chicago, Illinois, United States.
- Shuai, P**, Chen X, Mital U, Coon E and Dwivedi D, 2021. *The Effects of Spatial and Temporal Resolution of Meteorological Forcing on Watershed Hydrological Responses*. Oral presentation at AGU Fall Meeting 2021, New Orleans, Louisiana, United States.
- Shuai, P**, Chen X, Hammond G, Song X, 2020. *Influence of Hydrologic Exchange Flows on Biogeochemical Dynamics in A Regulated River Reach: 3-D Reactive Transport Modeling in PFLOTRAN*. Poster presentation at AGU Fall Meeting 2020, San Francisco, California, United States.
- Shuai, P**, Chen X, Hammond G, Song X, Chen K, Zachara JM, Perkins WA, and Richmond MC, 2019. *Dam Induced Hydrologic Exchange Flows Alter River Corridor Thermal Regime*. eLightning presentation at AGU Fall Meeting, San Francisco, California, United States.
- Shuai, P**, Chen X, Song X, and Chen K, 2019. *Boosting Research Reproducibility: Managing High Performance Model Simulation Workflow Using Jupyter Notebook*. Poster presentation at AGU Fall Meeting, San Francisco, California, United States.
- Shuai, P**, Chen X, Hammond G, Song X, Chen K, Zachara JM, Perkins WA, and Richmond MC, 2019. *Hydrologic Exchange Flows Alter River Corridor Thermal Regime at Hanford Reach*. Oral presentation at Post-graduate Research Symposium at PNNL, Richland, Washington, United States.
- Shuai, P**, Chen X, Song X, and Chen K, 2019. *Boosting Research Reproducibility: Managing High Performance Model Simulation Workflow Using Jupyter Notebook*. Oral presentation at Techfest 2019, Richland, Washington.
- Shuai, P**, Chen X, Hammond G, Song X, Chen K, Zachara JM, Perkins WA, and Richmond MC, 2019. *Modeling River Corridor Thermal Regime Using High Performance Parallel Subsurface Simulator: An Example with PFLOTRAN*. Oral presentation at Modflow and More 2019, Golden, Colorado.
- Shuai, P**, Chen X, Song X, Hammond G, Zachara JM, Royer P, Ren H, Perkins W, Richmond M, Huang M, 2019. *Dam Operations and Subsurface Hydrogeology Control Dynamics of Hydrologic Exchange Flows in a Large Regulated River Corridor within the Hanford Reach, Washington*. Oral presentation at 12th Washington Hydrogeology Symposium, Tacoma, Washington.
- Shuai, P**, Chen X, Song X, Hammond G, Zachara JM, Royer P, Ren H, Perkins W, Richmond M, Huang M, 2018. *Hydrogeomorphic Controls on Hydrologic Exchange Flows Dynamics within a Large Regulated River Corridor*. Poster presentation at AGU Fall meeting, Washington, DC, United States.
- Wang L, **Shuai, P**<sup>+</sup>, Myers K, Knappett PSK, Cardenas MB. 2018. *Accumulation of arsenic in dynamic iron oxide barriers due to river stage oscillations: A multiphysics modeling analysis*. Oral presentation at AGU Fall meeting, Washington, DC, United States
- Shuai, P**, Chen X, Song X, Hammond G, Zachara JM, Royer P, Ren H, Perkins W, Richmond M, Huang M, 2018. *Hydrologic Exchange Flows Dynamics along a Large Regulated River Corridor*. Oral presentation at Post-graduate Research Symposium at PNNL, Richland, Washington, United States.
- Shuai, P**, Knappett PSK, 2017. *Tidal and Seasonal River Stage Fluctuations Impact the Formation of Permeable Natural Reactive Barriers in Riverbank Sediments*, Oral presentation at AGU Fall Meeting, New Orleans, LA
- Shuai, P**, Knappett PSK, Hossain S, Hosain A, Rhodes K, Ahmed KM, Cardenas MB, 2016. *Estimating hydraulic properties of a river bank aquifer under tidal influence*, Poster presentation at GSA Annual Meeting, Denver, CO
- Shuai, P**, Hossain A, Rhodes K, Knappett PSK, Dimova, N, Cardenas, MB, Matin K R, Michael H, Mozumder R, van Geen A, 2015. *Modeling arsenic mobilization in a riverbank aquifer under the influence of tidally fluctuating river and irrigation pumping*, Poster Presentation at AGU Fall Meeting, San Francisco, CA

Teaching Experience \_\_\_\_\_

Sept, 2025	<b>ATS short course</b> , co-Instructor	Knoxville, TN
Spring, 2025	<b>Hydrologic Modeling</b> , Instructor	Utah State University
Spring, 2024-25	<b>GIS for Civil Engineers</b> , Instructor	Utah State University
Fall, 2023-25	<b>Groundwater Engineering</b> , Instructor	Utah State University
Sept, 2021	<b>ATS short course</b> , co-Instructor	Online
Spring, 2017	<b>Hydrogeology</b> , Guest Lecturer	Texas A&M University
Spring, 2017	<b>Introduction to Geochemistry</b> , Teaching Assistant	Texas A&M University
Fall, 2016	<b>Hydrogeology</b> , Teaching Assistant	Texas A&M University
Fall, 2015	<b>Physical Geology</b> , Teaching Assistant	Texas A&M University
Spring, 2014	<b>Principals of Geology</b> , Teaching Assistant	Texas A&M University

## Research Projects & Grants Funded

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### USGS WRRRA 104(b) Annual Base Grant

SINGLE PI

Dec. 2025 - Nov. 2026

- *Funding Agency*: USGS
- *Projects*: Enhance the representation of groundwater-surface water interactions within a water management system model for Cache Valley, Utah (USU:\$32,000)
- *Team*: **Shuai P** (PI)

### CIROH at University of Alabama

PI

Jun. 2024 - May. 2026

- *Funding Agency*: NOAA awarded to the Cooperative Institute for Research on Hydrology (CIROH) through The University of Alabama
- *Projects*: Improving low-flow estimates in the NextGen Framework through improved subsurface conceptualization and parameterization (Total:\$500,000, USU:\$ 267,748 )
- *Team*: **Shuai P** (PI), Kumar M (CoPI)

### USGS WRRRA 104(b) Annual Base Grant

SINGLE PI

Sep. 2024 - Aug. 2025

- *Funding Agency*: USGS
- *Projects*: Advance the representation of groundwater in a water management system model for the Bear River Watershed (USU:\$32,000)
- *Team*: **Shuai P** (PI)

### CIROH at University of Alabama

PI

Jun. 2023 - May. 2025

- *Funding Agency*: USGS awarded to the Cooperative Institute for Research on Hydrology (CIROH) through The University of Alabama
- *Projects*: Advance water management-hydrologic model coupling to improve hydrologic forecasting in managed watersheds (Total:\$340,466, USU:\$204,280)
- *Team*: **Shuai P** (PI), Triana E (CoPI)

### DOE Office of Biological and Environmental Research (BER)

co-PI

Sep. 2023 - Aug. 2026

- *Funding Agency*: DOE BER ESS
- *Projects*: Dynamics of interconnected surface-subsurface flow and reactive transport processes across the hillslope-riparian zone-river corridor continuum of cold, high-latitude watersheds (Total:\$1,000,000, USU:\$265,000)
- *Team*: Cardenas MB (PI), Neilson B (CoPI), **Shuai P** (CoPI), Cory R (CoPI), Kling G (CoPI), Coon E (CoPI)

### ExaSheds subcontract through PNNL - DOE

SINGLE PI

Dec. 2022 - Sep. 2023

- *Funding Agency*: DOE BER
- *Projects*: ATS modeling in Neversink Watershed (USU: \$60,000)
- *Team*: **Shuai P** (PI)

**PNNL Laboratory Directed Research and Development (LDRD) - DOE**

PI

Oct. 2021 - Sep. 2022

- *Funding Agency:* PNNL LDRD
- *Projects:* A python package for visualizing unstructured hydrologic models (\$2,500)
- *Team:* **Shuai P** (PI)

**DOE Office of Biological and Environmental Research (BER) - SFA**

TASK LEAD

2020 - 2023

- *Funding Agency:* DOE BER
- *Projects:* River Corridor Hydrobiogeochemistry from Reaction to Basin Scale
- *Team:* Tim Scheibe (PI), James Stegen (CoPI), Xingyuan Chen (CoPI), **Shuai P** (Task Lead), and others

**DOE Office of Biological and Environmental Research (BER)**

TASK LEAD

2020 - 2022

- *Funding Agency:* DOE BER
- *Projects:* ExaSheds: Advancing Watershed System Understanding through Exascale Simulation and Machine Learning
- *Team:* Carl Steefel (PI), Scott Painter (CoPI), **Shuai P** (Task Lead), and others

**PNNL Laboratory Directed Research and Development (LDRD) - DOE**

PI

Oct. 2019 - Sep. 2020

- *Funding Agency:* PNNL LDRD
- *Projects:* A collection of Jupyter notebooks for geoscientist (\$5,000)
- *Team:* **Shuai P** (PI)

**DOE Office of Biological and Environmental Research (BER)**

TASK LEAD

2017 - 2020

- *Funding Agency:* DOE BER
- *Projects:* Influences of Hydrologic Exchange Flows on River Corridor and Watershed Biogeochemical Function
- *Team:* Tim Scheibe (PI), James Stegen (CoPI), Xingyuan Chen (CoPI), **Shuai P** (Task Lead), and others

**Collaborative Research - NSF**

TASK LEAD

2014 - 2017

- *Funding Agency:* NSF Hydrologic Sciences Program
- *Projects:* The effects of river regulation on lateral and integrated longitudinal mass and energy transfers in coupled terrestrial-aquatic systems
- *Team:* Bayani Cardenas (PI), Bethany Neilson (Co-PI), Philip Benette (Co-PI), **Shuai P** (Task Lead), and others

**Graduate Research Grant - GSA**

PI

2015 - 2016

- *Funding Agency:* Geological Society of America
- *Projects:* Investigating impacts of irrigation pumping on Arsenic migration from Meghna River (\$2,500)
- *Team:* **Shuai P** (PI)

**Awards & Honors**

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| 2019      | <b>Honorable Mention Paper</b> , International Association of Chinese Youth in Water Sciences (CYwater) |
| 2013-2017 | <b>Graduate Fellowship</b> , Texas A&M University   |
| 2016      | <b>GSA On To the Future travel award</b> , Geological Society of America                                |
| 2011-2013 | <b>Graduate Fellowship</b> , Wuhan University   |

**Student Mentorship**

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**GRADUATE STUDENTS ADVISED (CURRENT)**

Devon Hill (PhD student, Co-advise with Beth Neilson), Fall 2024 - present  
Collins Stephenson (MS student), Fall 2024 - present  
Pamela Claure (PhD student), Fall 2023 - present

Ehsan Ebrahimi (PhD student), Fall 2023 - present

## GRADUATE STUDENTS ADVISED (ALUMS)

Jihad Othman (MS student), Fall 2022 - Summer 2024

## GRADUATE STUDENT COMMITTEES (CURRENT)

Brooklyn Taylor (MS student), Fall 2024 - present

Haley Canham (PhD candidate), Fall 2022 - present

Michael Lasswell (PhD student), Fall 2022 - present

Lauren Kremer (PhD student, Montana State University), Fall 2023 - present

Neelarun Mukherjee (PhD student, The University of Texas, Austin), Fall 2021 - present

## GRADUATE STUDENTS COMMITTEES (ALUMS)

Reza Morovati (MS student), Fall 2022 - Summer 2025

Chihiro Dixon (PhD student), Fall 2018 - Spring 2024

## Outreach & Professional Development

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### SERVICE AND OUTREACH

2022-present **AGU Groundwater Technical Committee**, member

2024 **AGU Fall Meeting**, Session Primary Convener for *H005: Advancements in Process-based Hydrologic Modeling to Support Water Resources Management*

2024 **USU Spring Mentor Training**, Participated in the Spring Mentor Training Sessions held on Logan campus

2023 **AGU Fall Meeting**, Session Primary Convener for *H51J: Advances in Coupled Human-Natural Systems Modeling to Improve Hydrologic Forecasting*

2023 **IHTM2.0 Workshop**, Participated in the Integrated Hydro-Terrestrial Modeling Workshop discussion and contributed to the discussion in the Upper Colorado River Basin breakout sessions

2022 **Guest Editor**, Frontiers in Water special issue: Integration of Machine Learning with Physics-Based Hydrologic Modeling

2020 **AGU Fall Meeting**, Session Primary Convener for *H226-Recent Advances in Large Scale, High Resolution Hydrologic and Flood Modeling Leveraging High Performance Computing*

2018-2023 **AGU Fall Meeting**, OSPA Judge

### PEER REVIEW – JOURNALS

Water Resources Research (8)

Journal of Hydrology (1)

Advances in Water Resources (1)

Frontiers in Water (1)

Geophysical Research Letter (1)

### PEER REVIEW – PROPOSALS

State of WI Groundwater Research and Monitoring Program (1)

### PROFESSIONAL MEMBERSHIPS



American Geophysical Union (2015-present)